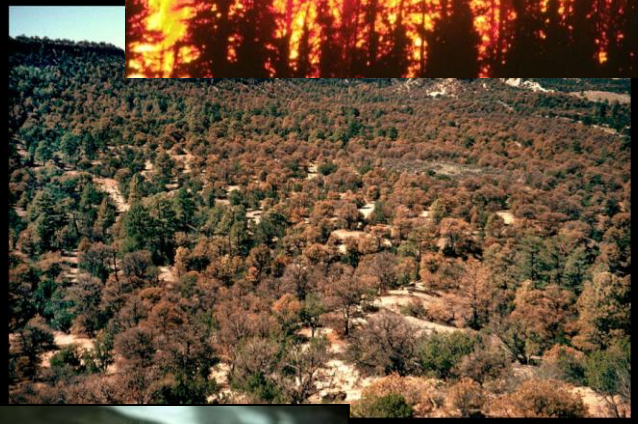
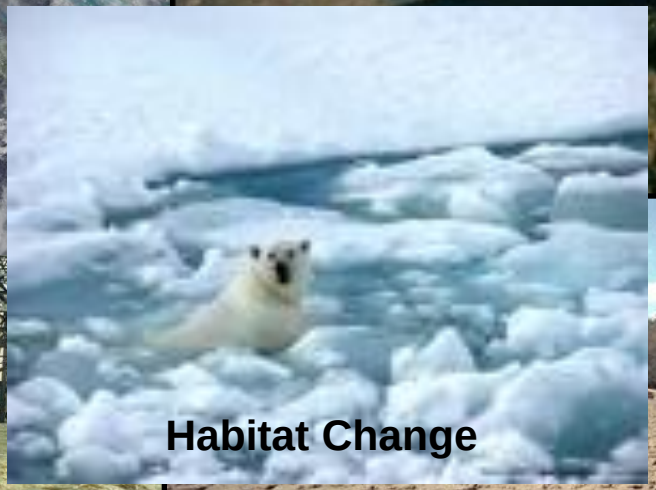
U.S. Department of the Interior

DOI's Climate Change Science, Adaptation & Mitigation Strategy

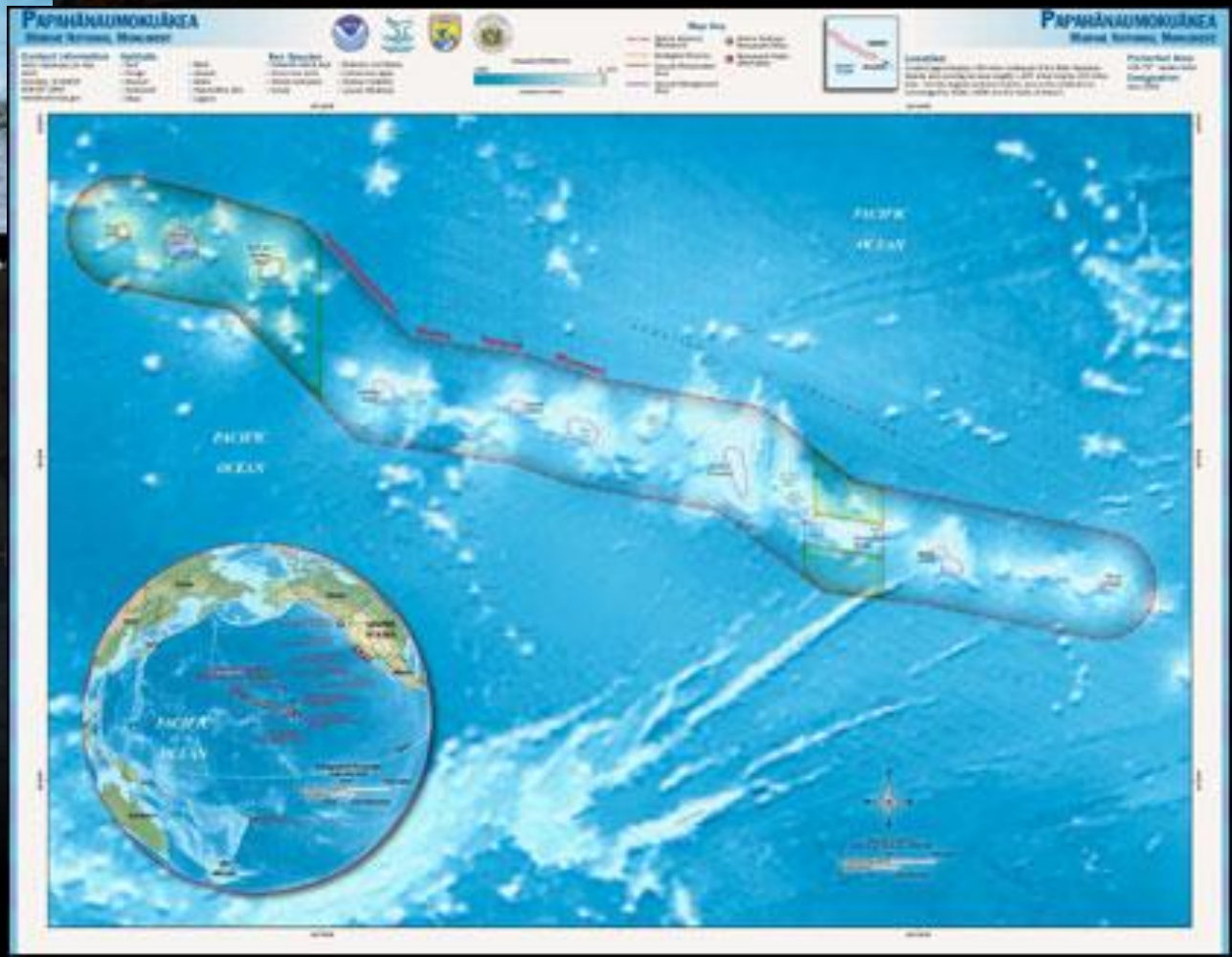


Thomas R. Armstrong, Ph.D.
Senior Advisor for Climate Change
Office of the Secretary
U.S. Department of the Interior

Climate Change Impacts



Ocean Impacts



Coastal Erosion in the Native Village of Shishmaref, Alaska

Wildlife Impacts

Pacific Brant, a small, dark sea goose, has shifted northward from low-temperate areas such as Mexico to sub-Arctic areas

Climate Impacts-- DOI's Stake

DOI is the Nation's Premier Steward for its Natural and Cultural Resources, including:

- Tribal Trust Responsibilities
- Ocean-related Responsibilities
- Resources Impacted by Sea-level Rise
- Resources Impacted by Coastal and Inland Erosion
- Wildlife Impacted by Climate Change
- Water Resources for Human and Ecological Needs
- Land Resources Impacted by Climate Change
  - Critical Habitat
  - Wildland Fire
  - Invasives and Pests
  - Etc.

SECRETARIAL ORDER NO. 3289

"Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources"

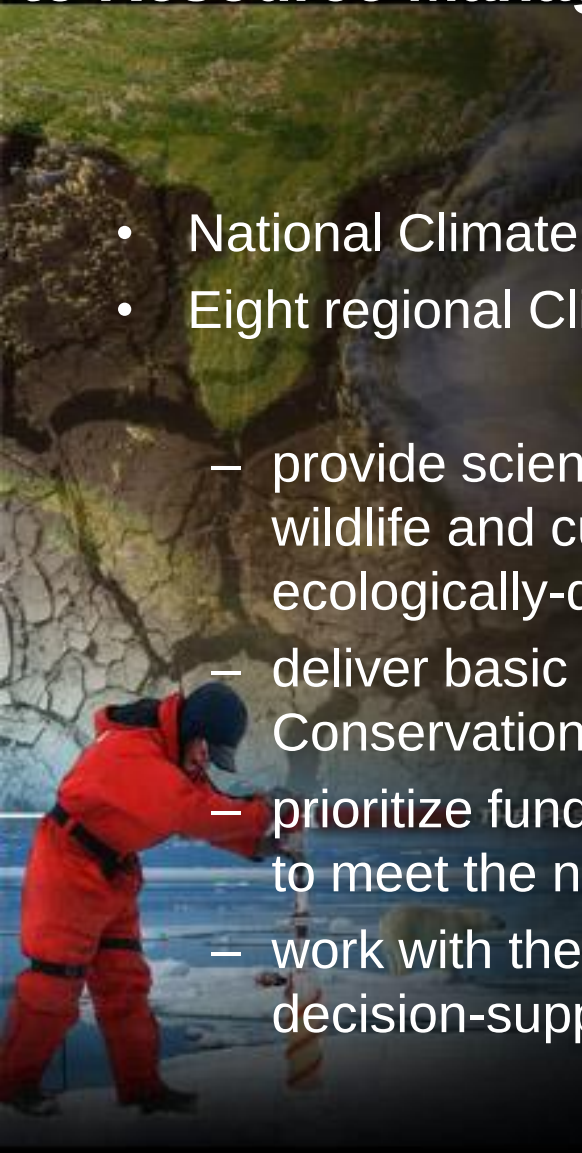
September 14, 2009

SECRETARIAL ORDER NO. 3289

Creates Energy and Climate Change Council for Oversight and Coordination of:

- Department-wide Response to Climate Change
- Climate Science Centers
- Landscape Conservation Cooperatives
- Data Integration and Management
- Carbon Storage Activities
  - Geological Sequestration
  - Biological Sequestration
- Carbon Footprint Project

DOI Climate Science Centers: Delivering Fundamental Climate- Impact Science to Resource Managers on a Regional Basis



- National Climate Change and Wildlife Center at USGS HQ.
- Eight regional Climate Science Centers (CSCs):
  - provide scientific information, tools and techniques for land, water, wildlife and cultural resource managers to adapt to climate and ecologically-driven responses at regional-to-local scales.
  - deliver basic climate-change-impact science to Landscape Conservation Cooperatives
  - prioritize fundamental science, data and decision-support activities to meet the needs of the LCCs.
  - work with the LCCs to develop adaptive management and other decision-support tools for managers.

Landscape Conservation Cooperatives: The On-the-Ground Applied Science and Adaptive Management Arm

- Landscape Conservation Cooperatives focus on-the-ground strategic conservation & adaptive management efforts at the landscape level.
  - Management-science partnerships that inform integrated resource-management.
  - Link science and conservation delivery.
  - LCCs are cooperatives, formed and directed by land, water, wildlife and cultural resource managers and other stakeholders.
  - Steering committees will include representatives from governmental entities (federal, state, tribal and local), as well as non-governmental organizations.
  - Each LCC functions within a specific landscape, but is also part of a national, and international network.
  - We invite all federal, state, tribal, local government and non-governmental management organizations to become partners.

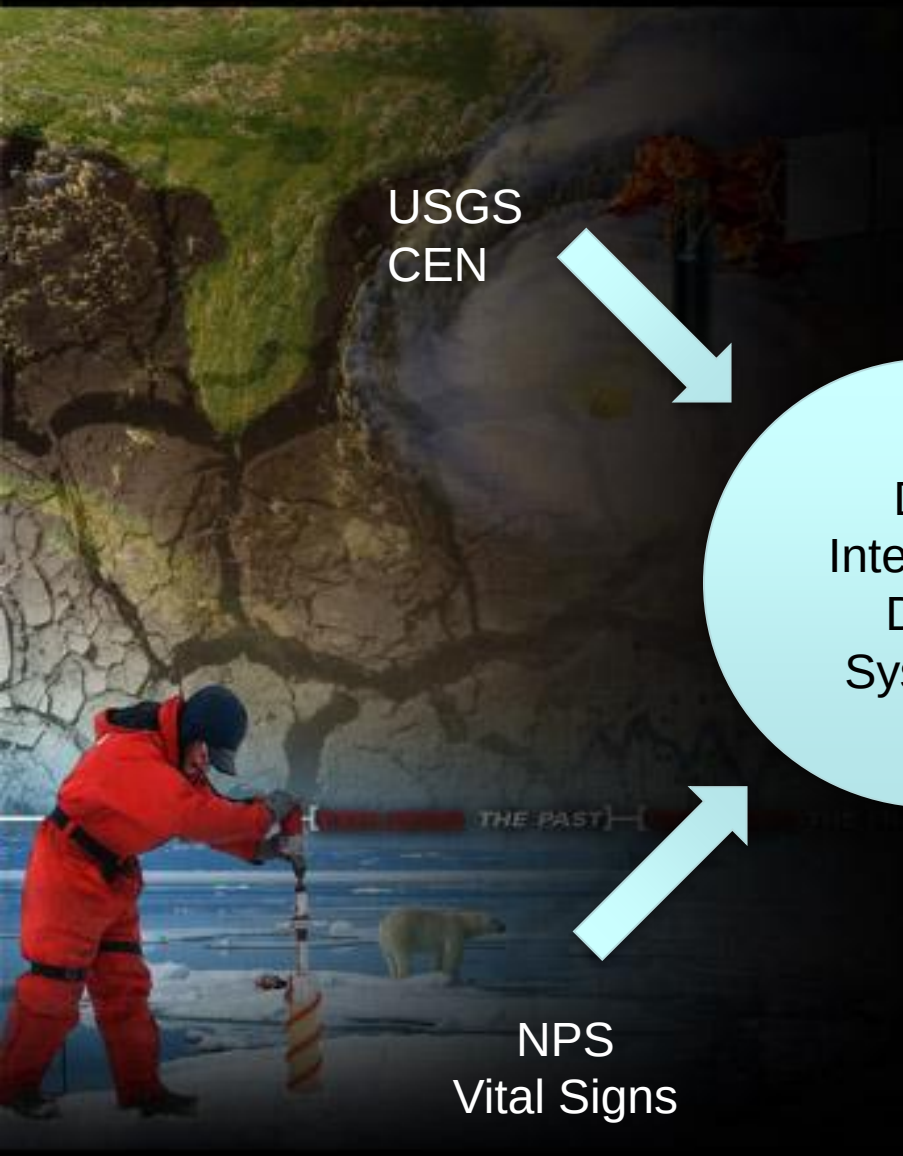
Data Integration: Climate Change Impacts

DOI data collection, management and integration can provide a strong foundation for understanding of climate change impacts– from local to global scales.

Goals:

- Make DOI data collection comprehensive, integrated, standardized, and accessible.
- Integrate capabilities to provide essential data to other federal and state agencies, universities, Tribes, NGO's and private landowners.
- Integrate this effort in to broader Data.gov effort.

Convergence of Data Systems and Information



USGS
CEN

BLM
Landscape Monitoring

DOI
Integrated
Data
Systems

NPS
Vital Signs

Other DOI
Bureau Systems

U.S. Department of the Interior

Search

HOME | WHO WE ARE | WHAT WE DO | BUREAUS & OFFICES | NEWS

Interior for...

- PUBLIC
- GOVERNMENTS
- BUSINESSES
- NATIVE AMERICANS
- TOURISTS
- EMPLOYEES
- PRESS & MEDIA

Department of the Interior Recovery Investments

YOUR RECOVERY DOLLARS AT WORK

Recovery.gov | Interior Recovery

MULTIMEDIA

Web Cams | Videos

News Feed | Podcasts

FLU.GOV

Know what to do about the flu.

VISIT FLU.GOV

SHARE THIS WIDGET

DOI Home > What We Do > Climate Change > Strategy

Strategic Response to Climate Change

Print | Text Size A A A

Climate change is driving rapid and broad changes across the United States and the world. As the nation's primary land, water and wildlife manager, the U.S. Department of the Interior has an obligation to address the impacts that climate change is having on America's resources by developing effective adaptation and mitigation strategies.

We are fulfilling this obligation by investing in scientific research to better understand climate-change impacts, designing science-based strategies to protect our resources and people from climate change, and decreasing greenhouse-gas emissions into the atmosphere.

Climate Science Centers (Interactive map)

Landscape Conservation Centers (Interactive map)

- Examples of this work include:Adapting our water-management strategies to address the possibility of shrinking water supplies and more frequent and extended droughts to continue to supply drinking water to more than 31 million people and irrigation water to 140,000 farmers;
- Creating science-based strategies to conserve and manage fish and wildlife resources, including more than 800 native migratory bird species and nearly 2,000 threatened and endangered species;Protecting cultural and archaeological resources and iconic structures that may be affected by climate change;
- Addressing the impacts of climate change on American Indians and Alaska Natives;
- Reducing greenhouse-gas emissions from Interior buildings, vehicles, and operations, and through innovative land-use management practices.

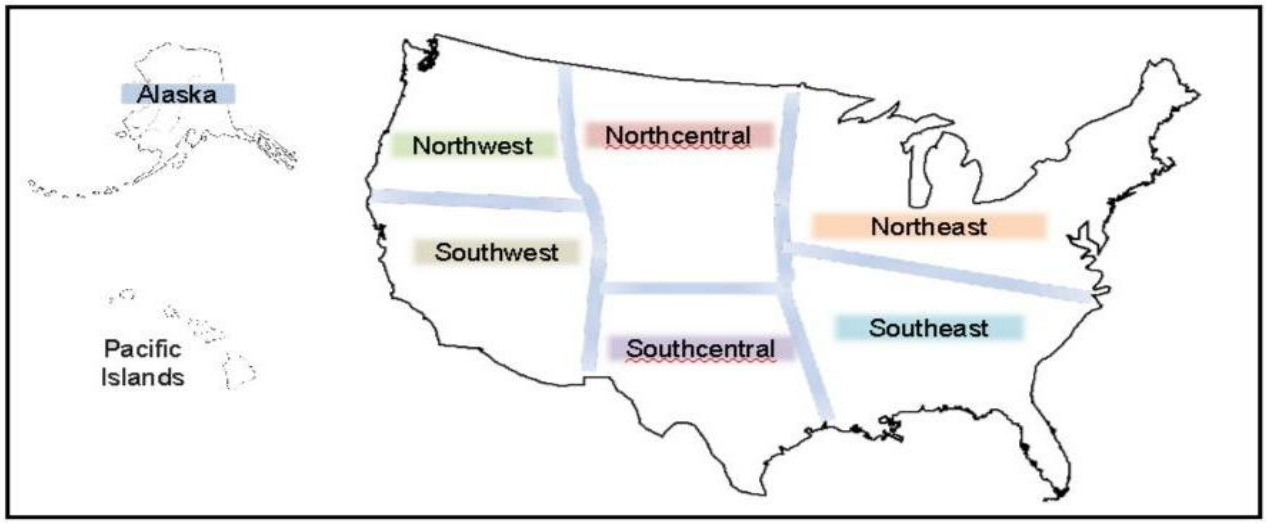
Secretarial Order No. 3289: Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources.

With his signing of Secretarial Order No. 3289 on Sept. 14, 2009, Interior Secretary Ken Salazar launched a climate-change-response strategy large and bold enough for us to meet these challenges. His order provides us with the framework to coordinate efforts among our Interior bureaus and to integrate our science and management expertise with that of our partners.

Two new initiatives – DOI Climate Science Centers and Landscape Conservation Cooperatives – form the cornerstones of this integrated approach to climate-change science and adaptation. Each has a a distinct science and resource-management role but also shares complementary capacities and capabilities. This strategy will serve the Department's land, fish, wildlife, water, marine, tribal, and cultural heritage managers, as well as for our federal, state, local, Tribal, NGO, private landowner, and other stakeholder partners.

Climate Science Centers

At Interior, we operate a National Climate Change and Wildlife Center at the National Headquarters of the U.S. Geological Survey. Under Secretarial Order No. 3289, we are expanding the scope and geographic reach of our climate-science efforts by establishing, in addition, eight regional Climate Science Centers. These CSCs will provide scientific information, tools and techniques that land, water, wildlife and cultural resource managers and other interested parties can apply to anticipate, monitor and adapt to climate and ecologically-driven responses at regional-to-local scales.

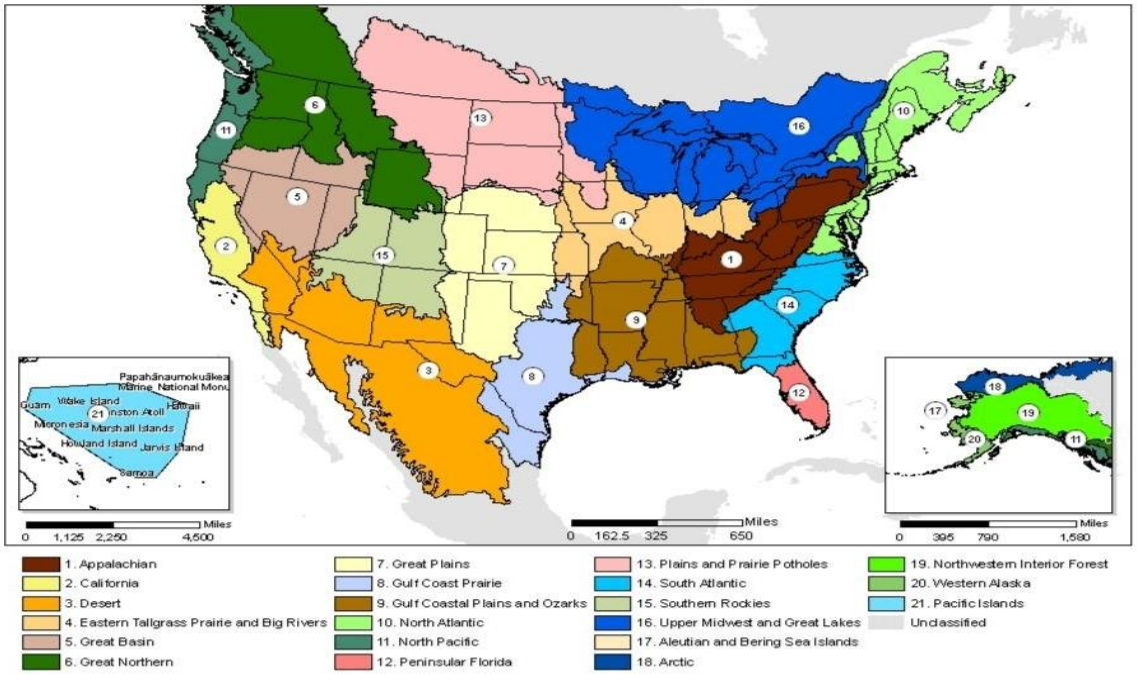


CSCs will deliver basic climate-change-impact science to Landscape Conservation Cooperatives within their respective regions, including physical and biological research, ecological forecasting, and multi-scale modeling. CSCs will prioritize their delivery of fundamental science, data and decision-support activities to meet the needs of the LCCs. This includes working with the LCCs to provide climate-change-impact information on natural and cultural resources and to develop adaptive management and other decision-support tools for managers.

We will be basing these regional CSCs at host institutions with substantial expertise and partnerships in climate-change science. CSCs will include staff from multiple partners, perhaps including LCC staff, and will include a cadre of scientists, as well as information specialists.

Landscape Conservation Cooperatives

In addition to establishing CSCs to provide basic climate-change science at the regional level, Secretarial Order No. 3289 establishes Landscape Conservation Cooperatives, which focus on on-the-ground strategic conservation efforts at the landscape level.

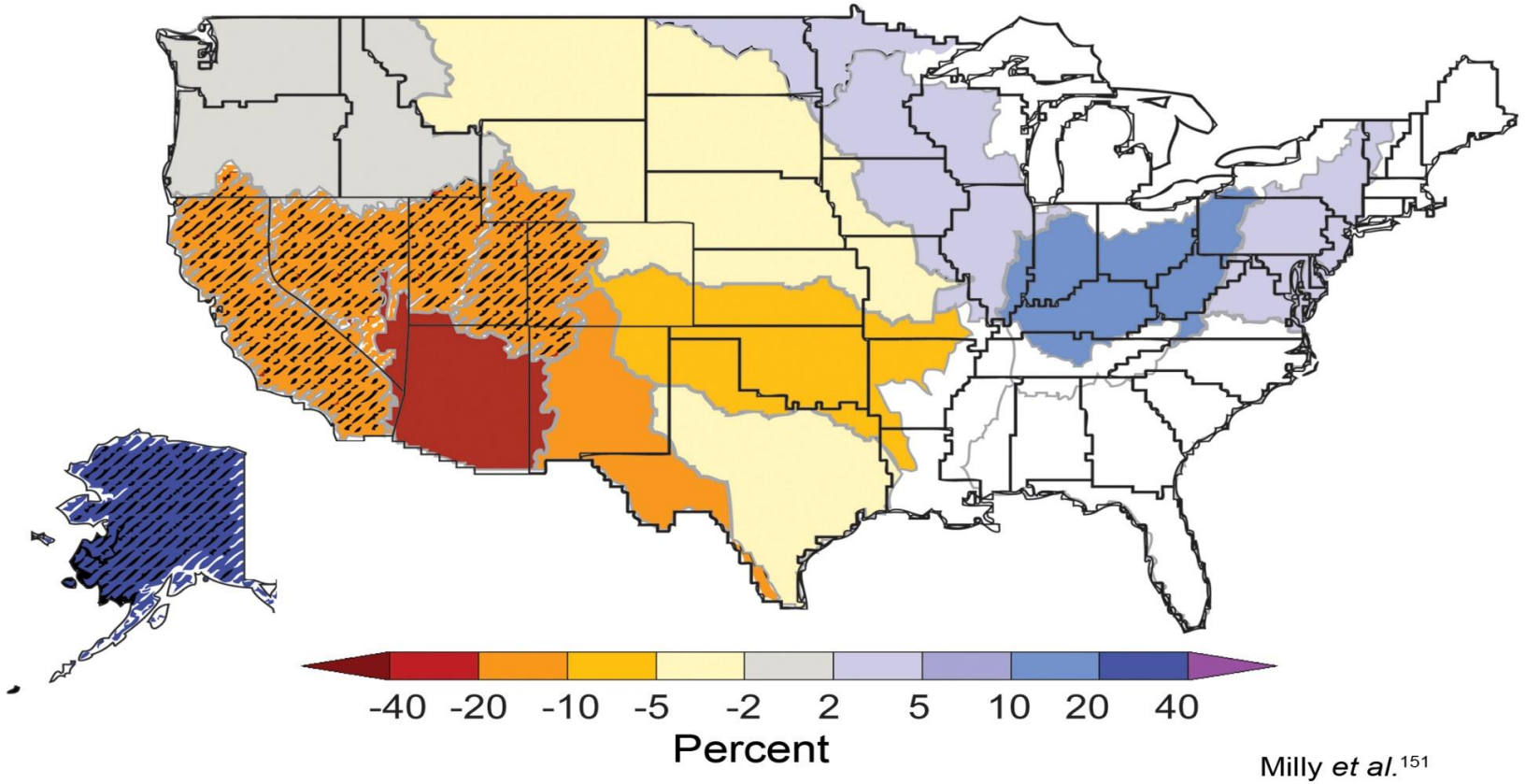


LCCs are management-science partnerships that inform integrated resource-management actions addressing climate change and other stressors within and across landscapes. They will link science and conservation delivery.

At the core of each LCC will be a scientific and technical staff with an applied resource-management focus. That staff and capacity will operate under the direction of a steering committee, consisting of resource-management representatives. LCC steering committees will include representatives from governmental entities (federal, state, tribal and local), as well as non-governmental organizations who are prepared to contribute to the joint effort.

Each LCC functions within a specific landscape, but it also will be part of a national, and ultimately, international network. LCCs are true cooperatives, formed and directed by land, water, wildlife and cultural resource managers and interested public and private organizations. We invite all federal, state, tribal, local government and non-governmental management organizations to become partners in their development.

Adaptation: Streamflow Related to Climate Change

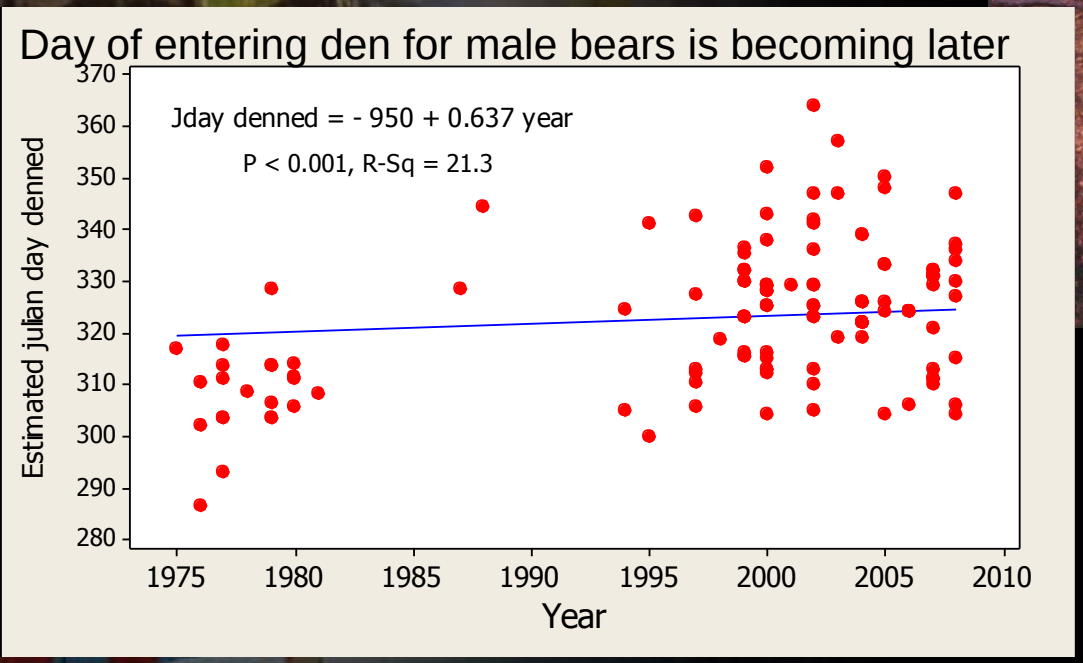


Milly *et al.*[151]

Runoff, which accumulates as streamflow, is the amount of precipitation that is not evaporated, stored as snow pack or soil moisture, or filtered down to groundwater. Projected changes in median runoff for 2041-2060, relative to a 1901-1970 baseline, are mapped by water-resource region. Colors indicate percentage changes in runoff. Hatched areas indicate greater confidence due to strong agreement among model projections. White areas indicate divergence among model projections. Results are based on emissions in between the lower and higher emissions scenarios.[91]

Adaptive Management: Climate Change Impacts on Grizzly Bears

Male bears entering den later….



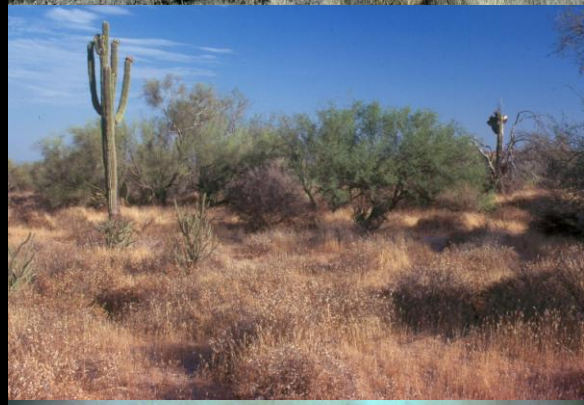
Male bear mortality rising

Adaptation: Invasive Species and Fire

The Problem:
Annual grasses are increasing throughout the western U.S. Drought and climate change may shift distributions, but drought-tolerant species continue to spread, increasing fire frequency and intensity, and eliminating wildlife, livestock forage and habitat

The Science:
- Mapping annual plant invasions
- Understanding factors controlling invasion
- Documenting ecological effects of invasion
- Investigating soil additives to enhance restoration
- Mapping historic fires to understand causes

Management Options:
Prevent invasion by:
- Mapping vulnerable soils, avoid soil disturbance
- Fostering biological crusts
- Controlling fires as much as possible
- Restoring native plant species



Adaptation to Rising Sea Level
North Carolina Albemarle Peninsula & Alligator River NWR

Challenge: Sea level rise is due to melting ice sheets and glaciers & thermal expansion of our oceans. Without action, this refuge may lose 67% of swamp & 90% of dry land by 2100.

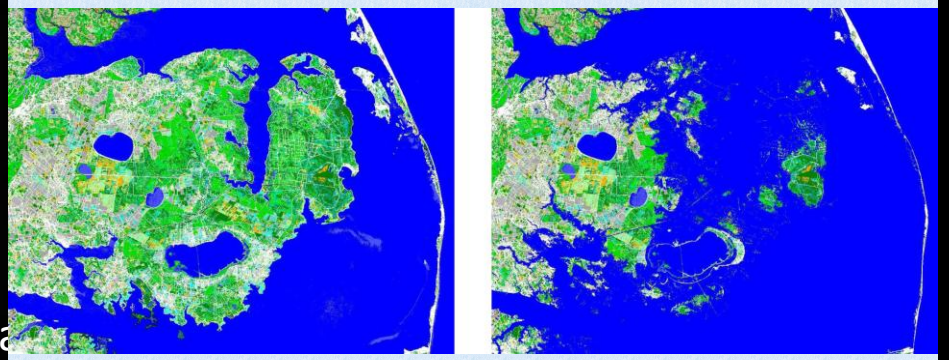
Science: The USGS is conducting a national risk assessment due to future sea-level rise.

Solutions:

- Restore Wetland Hydrology from damage caused by artificial ditches
- Reforest and Restore existing natural coastal & inland habitat to facilitate species migration as sea level rises
- Oyster Reef Restoration in Pamlico Sound to protect shorelines from storms & rising sea
- Measuring and Monitoring effects of management on soil carbon

North Carolina's Albemarle Peninsula

The two maps below show present conditions on the left and, on the right, the extensive areas that would be flooded by the most conservative projection of 32 inches of sea level rise in the next 100 years.

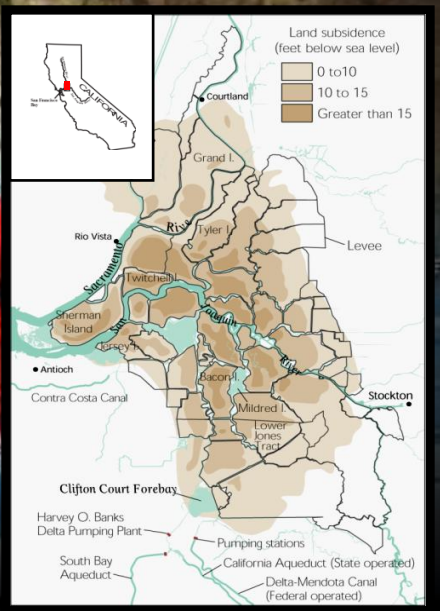


More than 540,000 acres on the Peninsula are currently under conservation protection . . . . & we could lose as much as a million acres to rising seas within the next 100 years. (information from TNC)

Adaptation and Mitigation: Sacramento-San Joaquin Delta

Challenge: The oxidation of drained, agricultural peat soils emit massive CO2 into the atmosphere. Peat oxidation has caused Delta islands to subside >25ft below land surface, causing levee vulnerability, increasing flood potential and shutting down CA's water supply system

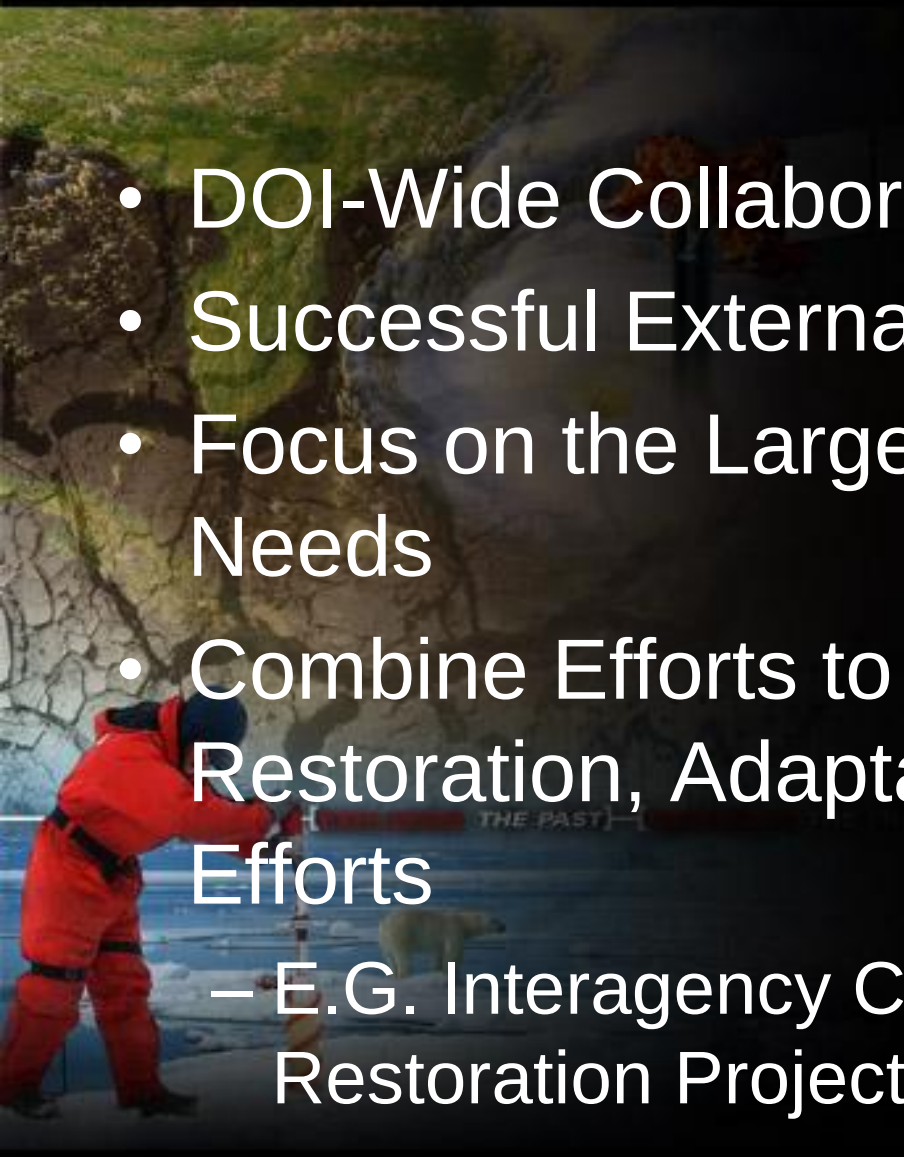
USGS Twitchell Island Pilot Study: Since 1996, management prioritized maximized production of plant biomass and reduced decomposition, resulting in land surface elevation increase.



Solutions through Management:

- Virtually eliminate emissions of CO2
- Stop and reverse land subsidence, thereby decreasing levee vulnerability and increasing water supply reliability
- Capture and sequester CO2 in greater amounts than other land uses

Challenges



- DOI-Wide Collaboration
- Successful External Partnerships
- Focus on the Large Picture & Local-Scale Needs
- Combine Efforts to Respond to Restoration, Adaptation, & Mitigation Efforts
  - E.G. Interagency Chesapeake Bay Restoration Project

Thank You!